

this time probably eight-tenths obscured with heavy cumulus and stratus clouds; the round lumpy cumulus clouds were underneath the more compact stratus formation. No whirling motion was observed, and no attention would likely have been paid the storm, had it not been for the intense inky blackness of the clouds and their steady progression against the wind which was blowing at the rate of about 14 miles per hour from the southeast; the clouds were moving directly from the northwest and very rapidly.

A heavy downpour of rain began at 12:06 p. m., with sky now entirely overcast, but the wind still from south to southeast. At 12:16 p. m. the wind suddenly shifted from south to northwest, and increased in velocity from 12 to 50 miles per hour in less than five minutes, reaching a maximum velocity of 63 miles per hour, and an extreme velocity of 75 miles per hour at about 12:30 p. m. The cable connecting the anemometer to the self-register was broken at 1 p. m., and no record was obtained until after 4 p. m., but the gale continued until about 2 p. m., with but slightly diminished intensity. By 3 p. m., however, the wind had fallen to 8 miles per hour, and had changed to the southeast.

The rain literally came down in sheets, and the storm probably comes as near to reaching the dignity of a cloud-burst as any rainfall ever observed here. There was no preliminary sprinkle as a curtain-raiser, but the curtain was pulled aside and the rain literally poured; 3.02 inches fell from 12:06 to 12:45 p. m., and the sky became so dark that gas was lighted in churches and offices.

The following barometer readings will show that the fluctuations in the atmospheric pressure were larger than ordinary:

Time.	Temperature.	Barometer.	Time.	Temperature.	Barometer.
	°	Inches.		°	Inches.
12:05 p. m. ....	81.0	28.646	12:30 p. m. ....	80.0	28.523
12:10 p. m. ....	81.0	28.656	12:45 p. m. ....	80.0	28.640
12:30 p. m. ....	81.0	28.650			

At about 12:30 p. m. a heavy trap door on the roof of the Government building was thrown open with sufficient force to break a new quarter-inch cord; the windows and doors were all closed at the time, showing very strong outward pressure. The windows of two buildings near this one had their sashes blown out at about the same time.

The electrical display was vivid but not more than ordinarily severe. The storm was entirely local in extent, although from the amount of rain and the time the gale lasted it would appear impossible that the stupendous energy could have been confined to a prescribed locality.

#### PROF. P. E. DOUDNA.

By F. CAJORI.

Meteorology has lost a promising investigator in the person of Pearl Eugene Doudna, who at the time of his death held the position of assistant professor of mathematics in Colorado College. Mr. Doudna died at Colorado Springs on the 6th of last January. For five years he had been in charge of the voluntary meteorological station maintained by Colorado College. During the last few months of his life he was engaged in arranging for publication the local meteorological data, reaching back over many years. With the help of a few students the task was completed the day after the beginning of his last illness.

Mr. Doudna published, in Vols. VII and VIII of Colorado College Studies, a paper entitled Equations of Motion of a

Perfect Liquid and a Viscous Liquid, which displays power in original research and is well worthy of examination on the part of specialist on this subject.

Mr. Doudna was born in Richland County, Wis., in 1868. He graduated from the University of Wisconsin in 1894 and was made fellow in mathematics at his alma mater. In 1895 a serious illness compelled him to resign. He went to Colorado Springs and became connected with Colorado College. For five years he taught mathematics with signal success. He interested several students in meteorology, and it was his plan during the coming year to offer a regular course on this subject.

#### HALO AT DETROIT, MICH., MAY, 1900.

By JOHN K. HOOPER, Observer Weather Bureau.

An optical phenomenon which was observed at Detroit, Mich., the morning of May 19, 1900, is deemed sufficiently interesting to meteorologists generally to record at length, because of its remarkable distinctness, and the beauty and novelty of its design. While halos of different radii are common at Detroit, optical phenomena of this magnitude and brilliancy are of rare occurrence.

It brought forth numerous startling theories as to its origin and forecasts of events to occur, and proves again that mediæval superstitions are not outgrown; it seemed as if all who saw it besieged the Weather Bureau station with inquiries, the telephone bell ringing continually during the exhibition.

The phenomenon was first noted at 11:15 a. m., seventy-fifth meridian time. It then consisted of two complete circles of 22° and 45° radii around the sun. The former was of vivid brightness, red on the inside, changing to yellowish white at the outer edge; it was doubled also, the circles but a fraction of a degree apart, yet showing the separation plainly, intersecting each other at points directly above and below the sun, bearings north-northwest—south-southeast. The circle of 45°, which contained all the colors of the spectrum, though the red predominated, was not as bright.

Soon after the phenomenon was first observed the latter grew faint at the point immediately above the sun; it faded evenly along both the east and west portions, and at 11:30 a. m., when about 90°, had disappeared, a white circle, with a radius of 22°, became visible, having for its center the upper intersection of the double inner circles, cutting those and passing through the sun but forming no parhelia.

The maximum was reached at 12 noon. At 12:15 p. m., when more of the circle of 45° had faded, there appeared three white segments, the apparent radius of each 45° convexly in contact with the inner halo, one bearing directly north, the others east and west, and the first forming a faint parhelia at its junction with that circle. At this time the complete white circle had faded materially. By 1 p. m. the white portions of the design had vanished, as had nearly all of the 45° halo, except a small arc directly under the sun. From this time the balance of the design grew indistinct, and by 1:30 p. m. all but a faint partial halo of 22° had disappeared. At 2 p. m. it had vanished altogether.

The sunrise was obscured by alto-stratus cloud formations, and this type prevailed during the morning. At 10:30 a. m. a huge mass of alto-stratus was noted approaching from the west, and by 11 a. m. the edge of the mass was in the vicinity of the sun. The clouds were decidedly grayish in color and smooth in texture, overspreading the sky toward the west. Much of the gray color had disappeared by 12:30 p. m., and the smoothness was less noticeable from that time. By 1 p. m. the mass showed signs of disintegration, and at 1:30 p. m. large patches of blue sky were in view in all directions; by 2 p. m. only small broken patches of cloud remained.

